



**21st Century U.S. Military Manuals: Opposing  
Force Worldwide Equipment Guide (WEG)  
Volume 2: Airspace and Air Defense Systems (Part  
2) - Air Defense, Improvised Aerial Systems,  
Countermeasures**

*U.S. Government, Department of Defense, U.S. Army*

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This Worldwide Equipment Guide (WEG) describes the spectrum of worldwide systems and system trends in the Contemporary Operational Environment (COE), serving as an authoritative "encyclopedia" of weapons around the world. This is the newest edition revised in 2011. This handbook is one of a series that describes a contemporary Opposing Force (OPFOR) for training U.S. Military commanders, staffs, and units. Together, these handbooks outline an OPFOR that can cover the entire spectrum of military and paramilitary capabilities against which the U.S. Military must train to ensure success in any future conflict.

Part Two of Volume Two covers air, air defense, improvised aerial systems, countermeasures.

Airship Support to Air Defense - Airships ("lighter-than-air" craft) have been used in warfare since the 1800s, when balloons offered elevated platforms for military observers. Airships are increasingly used in civilian venues and offer capabilities for military use, including air defense. Roles include support to communications, with airship lift for longer range antennae, and airborne mounting of communications retransmission systems. AD electronic warfare and RISTA units can use aerostats to raise recon systems. A simple method would be to attach a jammer round on a cable. A GPS jammer could be mounted on a vehicle-based aerostat or a dirigible moving within protected zones.

Partial contents: Airship Support to Air Defense \* Short Range Air Defense (SHORAD) \* Recent Developments in Very Short Range AD \* Adaptive Weapons for AD in Close Terrain \* Antihelicopter Mines for Use in Air Defense \* Helkir Antihelicopter mine \* Table: Antihelicopter mines \* Air Defense and Other Counters to UAVs \* Air Defense/Antitank (ADAT) Vehicles \* AD Gun and Gun/Missile Technology Trends \* Towed Antiaircraft (AA) Guns \* GDF-003/-005 and Skyguard III 35-mm \* M1939 37-mm \* KS-19M2 100-mm \* S-60 57-mm Towed \* Type 65 37-mm \* ZPU-4 14.5-mm Heavy Machinegun \* ZU-23 23-mm \* Self-Propelled AA Gun System \* BTR-ZD 23-mm SPAAG/Imp Gun-Missile System \* Gepard 35-mm SPAAG \* ZSU-23-4 23-mm SPAAG/Imp Gun/Missile Sys \* ZSU-57-2 57-mm SPAAG \* Man-Portable Surface-to-Air Missiles (SAMs) \* SA-7b/GRAIL \* SA-14/GREMLIN \* SA-16/GIMLET \* SA-18/GROUSE and SA-24/Igla-S \* Starstreak High Velocity Missile \* Stinger \* Albi MANPADS Launcher Vehicle/Mistral \* SHORAD SAM Systems \* 2S6M1 30-mm SP AA Gun/Missile System \* Pantsir-S1 30-mm SP AA Gun/Missile System \* Crotale 5000 and FM-90 \* Crotale-New Generation \* SA-8b/GECKO Mod 1 \* SA-9/GASKIN \* SA-13b/GOPHER \* SA-15b/GAUNTLET \* Medium Range Air Defense (MRAD) \* Recent Developments in MRAD Systems \* Aspide 2000 (Skyguard) \* SA-2/GUIDELINE \* SA-3/GOA, Pechora-2M \* SA-4b/GANEF Mod 1 \* SA-6/GAINFUL and SA-6b/GAINFUL Mod 1 \* SA-11/GADFLY \* Buk-M1-2 (SA-11 FO) and SA-17/GRIZZLY \* Long Range Air Defense (LRAD) \* Recent Developments in LR and High Alt AD \* SA-5/GAMMON \* S-300P Series Strategic Systems Comparison \* SA-10b/GRUMBLE \* SA-10c/GRUMBLE (export) \* SA-12a and SA-12b, Antey-2500, and SA-21b \* SA-20a/GARGOYLE \* SA-20b/Favorit Universal Sam System \* SA-21a/GROWLER/S-400 Sam System \*

CHAPTER 7 - IMPROVISED AERIAL SYSTEMS \* Airships in Military Applications \* RC Aircraft \* Powered Parachutes and Wingsuits \* Ultra-light Aircraft \* CHAPTER 8 - EQUIPMENT UPGRADES \* Table: Aerodynamic Systems Upgrades \* Table: Air Defense System Upgrades \* CHAPTER 9 - COUNTERMEASURES \* Table: Lethality Component vs. Countermeasure \* Table: Countermeasure vs. Sensors \* Table: Countermeasure vs. Weapons \* Table: Countermeasures by Functional Area \* CHAPTER 10 - EMERGING TECHNOLOGY TRENDS \* Technologies and Environments \* Table: Technologies and Applications \* Projected OPFOR Capabilities Near/Mid-Term \* Military Technology Trends 2021

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